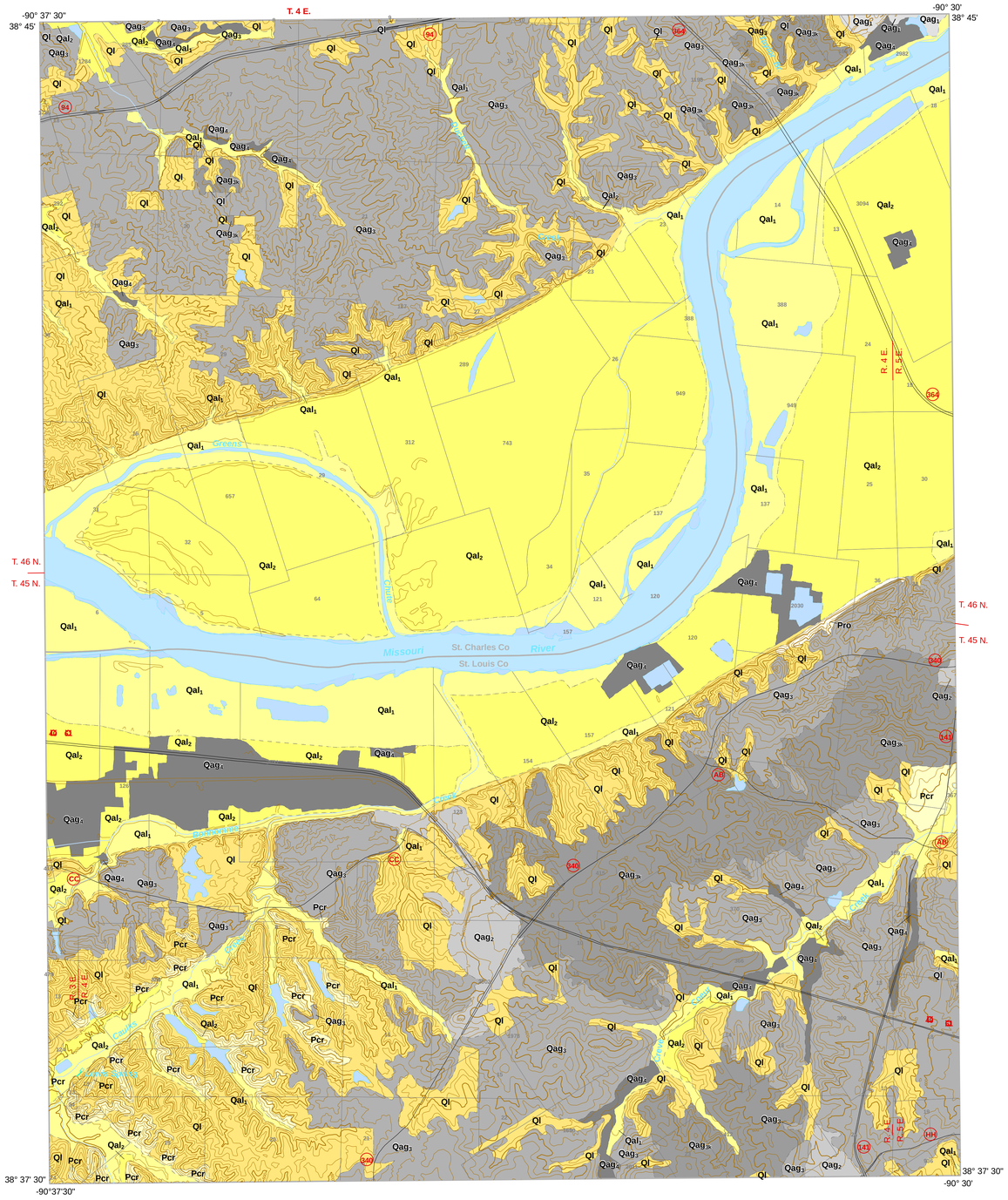


Projection: Universal Transverse Mercator (UTM) Zone 15 North.
Horizontal Datum: North American Datum of 1983 (NAD83).
Roads data edited from Missouri Department of Transportation All Roads Dataset, March 15, 2010.
County boundaries and public land survey system boundaries are from the Missouri Department of Natural Resources, 2009.
Streams data is from the United States Geological Survey, National Hydrography Dataset, 2008.
Hypsography data is from the United States Geological Survey, 2003.

Magnetic Declination: 0° -33' EAST
Declination is POSITIVE
Inclination: 67° 12'

SCALE 1 : 24,000

1 0.5 0 1 1 Miles

TOPOGRAPHIC CONTOUR INTERVAL 20 FEET

MISSOURI

QUADRANGLE LOCATION

ROAD CLASSIFICATION
U.S. Route
State Route

CHESTERFIELD QUADRANGLE, MISSOURI
7.5 MINUTE SERIES

LEGEND

Generalized Surficial Materials Profile

- Clay
- Sand and gravel
- Silt
- Carbonate rocks and chert
- Residual clay and chert
- Carbonate rocks, chert and sandstone

Data Map

Surficial Materials Thickness

Previous Data		Current Data
X	0' to 10'	T
X	10' to 25'	T
X	25' to 50'	T
X	50' to 75'	T
X	75' to 100'	T
X	Greater than 100'	T

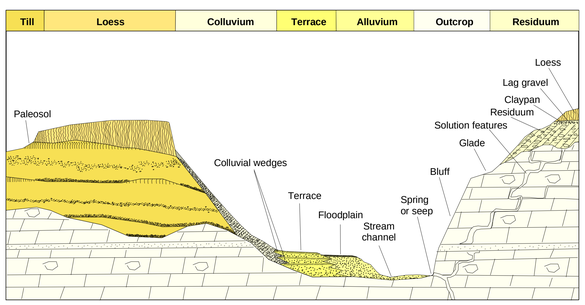
Surficial Materials and Inset Maps

- Contour Line - 20 feet
- Contour Line - 100 feet
- Major Road
- River - only large streams are shown
- 5 Section Line - section number shown

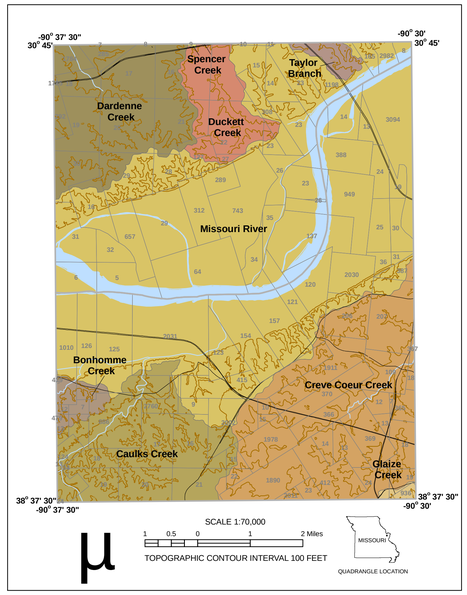
Surficial Materials Map

- Stratigraphic Contact - dashed where probable.

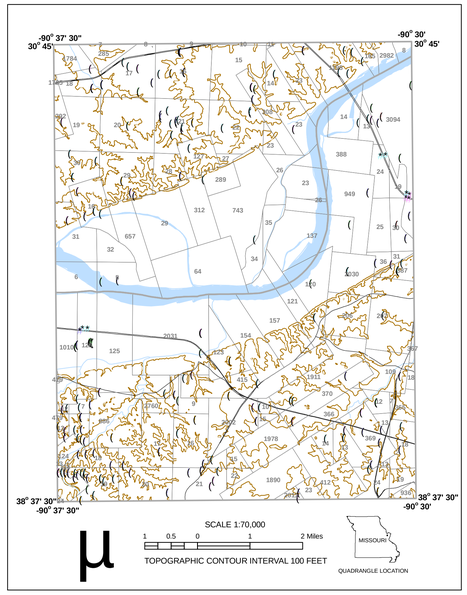
GENERALIZED SURFICIAL MATERIALS PROFILE



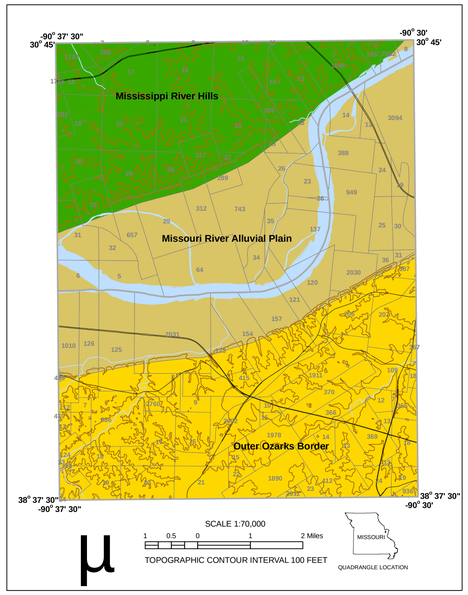
DRAINAGE BASIN MAP



DATA MAP



PHYSIOGRAPHIC MAP



SURFICIAL MATERIAL GEOLOGIC MAP OF THE CHESTERFIELD 7.5' QUADRANGLE ST. CHARLES AND ST. LOUIS COUNTIES, MISSOURI

Geology and Digital Compilation by
Grant Butler[1] and Michael A. Siemens[2]

2010

OFM-10-553-GS

MISSOURI DEPARTMENT OF NATURAL RESOURCES
DIVISION OF GEOLOGY AND LAND SURVEY
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PHYSIOGRAPHY

During the Quaternary Period, St. Louis area landscapes were buried under windblown loess deposits. Upland surfaces are a result of deposition and subsequent erosion of these loess deposits. Along slopes and in valleys, erosion has exposed older Quaternary sediments and sedimentary bedrock of Pennsylvanian-, Mississippian-, Devonian- and Ordovician-age. The northern portion of the Chesterfield Quadrangle lies within the Mississippi River Hills subsection of the Dissected Till Plain section of the Interior Lowlands division of the Central Lowlands physiographic province. The central portion of the quadrangle is in the Missouri River Alluvial Plain subsection of the Springfield-Salem Plateaus section of the Interior Highlands division of the Ozark Plateaus physiographic province. The southern portion of the quadrangle is in the Outer Ozark Border subsection of the Springfield-Salem Plateaus section of the Interior Highlands division of the Ozark Plateaus physiographic province. In the north-central portion of the quadrangle, Spencer Creek, with a few acres of headwaters north of Harvester, drains to Dardenne Creek, which exits the quadrangle in Federal Survey 1784 and is a tributary of the Mississippi River. All other drainages on the quadrangle are tributaries of the Missouri River. On the north side of the Missouri River, Duckett Creek joins the Missouri River floodplain in Federal Survey 308 and Taylor Branch enters in Federal Survey 1196. On the south side of the Missouri River, Bonhomme Creek enters the floodplain in Federal Survey 419 and Caulks Creek joins in Federal Survey 2031. Creve Coeur Creek exits the east side of the quadrangle in Federal Survey 367. Glaize Creek drains the southeast corner of the quadrangle. The lowest posted elevation is 430 feet msl along the Missouri River in the northeastern portion of the quadrangle. The highest posted elevation is 713 feet msl in Federal Survey 120 along the Missouri River bluffs. Total relief is greater than 283 feet.

SURFICIAL MATERIALS

Geomorphic processes have redistributed sediments and modified former land surfaces. On uplands, a mantle of windblown Pleistocene sediment remains. These silty sediments, primarily Peoria Loess (late Wisconsin age, 12 KA to 28 KA), are weathered and clay enriched. The Loess has been truncated on erosional slopes; resulting slope wash may include local detritus of residuum or colluvium weathered from Pennsylvanian-, Mississippian-, Devonian- and Ordovician-age bedrock. Along valley floors, Holocene-age alluvium consisting of sorted and unsorted gravelly to clayey sediments have accumulated. These deposits are coarsest in the headwaters of the drainage and fine significantly toward the mouth. Cuts and fills associated with urbanization have modified and redistributed surficial materials across the quadrangle. These modifications vary from the import of silty, alluvial sediments in the form of sod to the paving of large acreages related to retail developments. Drainages have been lined with storm sewers, are filled, channelized and straightened and are dammed for lakes; all of these modifications have altered sediment movement and characteristics across the quadrangle.

DESCRIPTION OF MAP UNITS

Qag$_1$ **PITS, QUARRIES** – Areas of former clay pits or stone quarries on hills. Downward movement of water through these areas is extremely variable.

Qag$_2$ **URBAN LAND** – Areas with nearly all of the surface covered by asphalt, concrete, buildings or other impervious materials on hills.

Qag$_3$ **URBAN LAND, CUT/FILL LOESS** – This unit is primarily urban land and areas of greater than six feet of cut and fill loess on hills. Urban land areas are impervious; cut and fill areas have variable layers of compaction which impede downward movement of water through the material.

Qag$_{3k}$ **URBAN LAND, CUT/FILL LOESS OVER KARST** – This unit is primarily urban land and areas of greater than six feet of cut and fill loess on karst topography hills. Urban land areas are impervious; cut and fill loess areas have variable layers of compaction which impede downward movement of water through the material. The karst topography is associated with dissolution in the underlying limestone bedrock which has affected surface geomorphology through sinkhole formation capturing local surface drainage. The downward movement of water through these areas varies from direct flow to groundwater systems to plugged and ponded.

Qag$_4$ **URBAN LAND, FILL ON ALLUVIUM** – This unit is primarily fill constructed terraces with urban land on alluvium in valleys. Included are areas which rarely flood (one to five times in 100 years). Urban land areas are impervious; fill areas have variable layers of compaction which impede downward movement of water through the material. The 1993 flood inundated most of this unit in the Missouri River valley.

Pro **PALEOZOIC RESIDUUM AND ROCK OUTCROP** – This unit occurs primarily on steep to very steep hillslopes along Missouri River valley bluffs south of the river in the vicinity of Hog Hollow Road and Water Works Road. It is dominated by clayey skeletal residuum soils that are less than 20 inches deep to limestone bedrock. Rock outcrop occurs as a major component in complex with these shallow soils. The shallow soils are somewhat excessively drained.

Pcr **PALEOZOIC COLLUVIUM AND RESIDUUM** – This unit occurs south of the Missouri River, primarily in the heavily dissected Caulks Creek watershed, on steep to very steep south- and west-facing hillslopes where the overlying loess layer is absent due to erosion. The soil formed in more than six feet of weathered colluvial over residual clayey-skeletal material derived primarily from cherty limestone with some interbedded shale and sandstone. These soils are well drained.

Qal$_1$ **FLOODPLAIN ALLUVIUM** – This unit is located on floodplains. The alluvial deposits are greater than six feet thick and flood frequently. In the Missouri River Valley, levees separate the frequently flooded areas (river side of levee) from the occasionally flooded areas. The soils are primarily moderately well-drained sandy over loamy and coarse-silty deposits, and excessively drained sandy to somewhat poorly drained fine-silty deposits, with some clayey poorly drained abandoned channel areas. Tributary floodplain soils north of the Missouri River are primarily somewhat poorly and moderately well drained fine-silty deposits. Tributary floodplain soils south of the Missouri River are primarily somewhat poorly to well drained fine silty and well drained coarse-silty deposits.

Qal$_2$ **FLOODPLAIN STEP ALLUVIUM** – This unit is located on floodplain steps that have been slightly elevated above the floodplain by stream down-cutting. The unit occurs primarily along the Missouri River where protected by levees. Somewhat poorly drained fine-silty, well drained coarse-silty, and poorly drained clayey alluvial soils are greater than six feet thick and are occasionally flooded (five to 50 times in 100 years). Also included are some flood-damaged areas (primarily 1993-1995 flooding) with excessively drained sandy deposits greater than six feet thick. The tributary floodplain soils north and south of the Missouri River are somewhat poorly through well drained fine-silty deposits.

Ql **LOESS** – This unit occurs on ridges and hillslopes (more commonly on less sloping north- and east-facing hillslopes) where Peoria Loess is greater than six feet thick. These fine-silty loess soils are well and moderately well drained.

HYDROLOGIC DISCUSSION

The permeability of the loess unit (Ql) is typically moderate but may be lower in older loesses with more clay development. The developed loess area (Qag$_3$) is largely paved or compacted by machinery and has low to moderate permeability. The developed loess area (Qag$_{3k}$) while largely paved is underlain by karst limestone and has moderate to high permeability. The permeability of floodplain units (Qal$_1$) and (Qal$_2$) is typically high in sandy to moderate in loamy areas, but is low in slackwater areas where clays have accumulated. The developed floodplain unit (Qag$_4$) is mostly paved resulting in low permeability. The colluvial and residual units (Pcr) and (Pro) typically exhibit high permeability, although individual outcrops and steep slopes may contribute more to run off than recharge. The developed land on hillsides unit (Qag$_2$) exhibits low permeability due to paving. The pits and quarries unit (Qag$_1$) typically exhibit low permeability but are variable depending on formation. Four springs in the Caulks Creek watershed are included in the divisions database for this quadrangle. Lewis Spring in the northeastern portion of Federal Survey 0124 is the largest in the area and has a flow of up to 100 gallons per minute. Stegman Spring, located in the northeastern portion of Federal Survey 0886, is the only other named spring on the quadrangle. There is no flow data for Stegman Spring or the two unnamed springs in the southeastern portion of Federal Survey 0125. The lower Missouri River was in flood seven times during the mapping year. Fall rains brought the river up in November. Spring melt and rains caused high water in March, April and May. Summer rains caused more high water in June and July. The upper reaches of Caulks Creek have been classified as losing from where it enters the quadrangle in Sec. 19, T. 45 N., R. 4 E. to the northwestern portion of Federal Survey 0124. The lower reaches of Bonhomme Creek have been classified as gaining from where it enters the quadrangle in Federal Survey 1010 to its confluence with the Missouri River in Federal Survey 0154. Stream classifications are determined by the Environmental Geology Section of the Division of Geology and Land Survey.

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